PROCEEDINGS

OF THE

AMERICAN PHILOSOPHICAL SOCIETY.

VOL. IV. JULY—DECEMBER, 1847. No. 39.

Stated Meeting, July 16.

Present, eighteen members.

Dr. CHAPMAN, President, in the Chair.

Professor Procter, a newly elected member, was presented to the President, and having signed the laws, took his seat.

Letters were received and read:—

From the Royal Asiatic Society, dated London, 17th April, 1847, acknowledging the receipt of Vol. IX., Part 3, of the Transactions of the Society, and of Nos. 34 and 35, Vol. IV., of the Proceedings of the Society:—

From the Geological Society of London, dated Somerset House, 29th April, 1847, returning thanks for Vol. IX., Part 3, of the Transactions, and Nos. 34 and 35, of the Proceedings:—

From the Corporation of the University of Cambridge, Mass., dated 16th April and 24th May, 1847, acknowledging the receipt of Nos. 36 and 37, of the Proceedings, and of Vol. IX., Part 3, of the Transactions of this Society:—

From the Royal Bavarian Academy of Sciences, dated 26th April, 1847, announcing donations of books to this Society, and acknowledging the receipt of Dr. Patterson's Early History of the Society, and the Transactions and Proceedings of this Society:—

From the Regents of the University of the State of New York, ex officio Trustees of the State Library, dated Albany, 24th May, 1847, acknowledging the receipt of the Proceedings of this Society:—

From Dr. Pierre Savi, Professor of Botany in the University of Pisa, no date, announcing a donation of books, and asking, on the part of the Librarian of the University of Pisa, for an exchange of books with this Society:—

From W. M'Ilvaine, dated Burlington, N. J., 18th June, 1847, asking the Society's acceptance of cards containing a new plan of a Perpetual Civil Calendar: and,—

From Mr. W. D. Lewis, in relation to the claim which he has on the Society.

The following donations were announced:—

FOR THE LIBRARY.

Real Museo Borbonico. Fascicolo 49, 1840; 50, 51, 1841; 52, 53, 1843; 54, 1844. Naples. 4to.—*From H. M. the King of the Two Sicilies.*

Journal of the Senate of the United States of America: being the First Session of the Twenty-ninth Congress; begun and held at the City of Washington, December 1, 1845, in the Seventieth Year of the Independence of the United States. Washington, 1845–46. 8vo.—*From the Department of State.*

Journal of the House of Representatives of the United States: being the First Session of the Twenty-ninth Congress. Washington, 1845–46. 8vo.—*From the same.*

Senate Documents: Public Documents, printed by order of the Senate of the United States, First Session of the Twenty-ninth Congress. In 9 Volumes. Washington, 1846. 8vo.—*From the same.*

Executive Documents, First Session, Twenty-ninth Congress. In 8 Volumes. Washington, 1845–46. 8vo.—*From the same.*

Reports of Committees, First Session, Twenty-ninth Congress. In 4 Volumes. Washington, 1845–46.—*From the same.*

Journal of the Royal Asiatic Society of Great Britain and Ireland. Vol. IX., No. 17, Part 2. Vol. X., Part 2. London, 1847. 8vo.—*From the Society.*

Monthly Notices of the Royal Astronomical Society of London. Vol. VII. March 12, 1847. No. 13. 8vo.—*From the Society.*

Journal Asiatique, ou Recueil de Mémoires, etc. etc., publié par la Société Asiatique. Quatrième Série. Tome IX. Nos. 40, 41. Janvier, Février, 1847. 8vo.—*From the Society.*

Annali delle Università Toscane. Tomo primo. Pisa, 1846. 8vo. *From the University.*

The African Repository and Colonial Journal. Vol. XXIII. July, 1847. No. 7. 8vo.—*From the American Colonization Society.*

The Annals and Magazine of Natural History. Vol. XIX. No. 127. May, 1847. 8vo.—*From Sir Wm. Jardine, Bart.*

The American Journal of the Medical Sciences. Edited by Isaac Hays, M.D. New Series. Vol. XIV. No. 27. July, 1847. 8vo.—*From the Editor.*

The Medical News and Library. Vol. V. July, 1847. No. 55. 8vo. *From Messrs. Lea & Blanchard.*

An Explanation of the Observed Irregularities in the Motion of Uranus, on the Hypothesis of Disturbances caused by a more distant Planet, &c.—*From J. C. Adams, Esq.*

A Treatise on the Practice of Medicine. By George B. Wood, M.D. In Two Volumes. Philadelphia, 1847. 8vo.—*From the Author.*

Proceedings of the General Society of the Cincinnati. With the original Institution of the Order, &c. Published by direction of the State Society of Pennsylvania. Philadelphia, 1847. 8vo.—*From Dr. Thomas M'Euen.*

Catalogue de la Bibliothèque de M. L. (Libri.) Seconde Partie.—8vo.—*From M. Hector Bossange.*

Catalogo Metodico dei Pesci Europei de Carlo L. Principe Bonaparte. Napoli, 1846. 4to.—*From the Author.*

Medical Botany: or Descriptions of the more important Plants used in Medicine, with their History, Properties, and Mode of Administration. By R. Eglesfeld Griffith, M.D. With upwards of 300 Illustrations. Philadelphia, 1847. 8vo.—*From the Author.*

Memoria del Cavaliere Gaetano Savi, Sull'origanum Majorana, origanum creticum e origanum Syriacum. 4to.

Descrizione di una Specie de Elæagnus e di varie altre piante Memorie del Professor Cav. Gaetano Savi. Modena, 1836. 4to.

Elogio del Prof. Gaetano Savi, morto in Pisa il 28 Aprile, 1844; scritto dal socio attuale Signor Marchese Cosimo Ridolfi. Modena, 1845. 4to.

Descrizione della Fimbristylis Cioniana del Dottor Pietro Savi, Professore di Botanica. Pisa, 1843. 8vo.

Sopra la Circolazione dei Liquidi nei Vegetabili considerazioni del Dottor Pietro Savi. 8vo.

Sopra Alcune Acacie Egiziane, Memoria de Prof. Cav. Gaetano Savi. Pisa, 1830. 8vo.

Notizie Storiche della Accademia Valdarnese del Poggio. Pisa, 1839. 8vo.

Memorie Scientifiche della Accademia Valdernese del Poggio. Pisa, 1841. 8vo.—*The foregoing Pamphlets from Professor Pietro Savi.*

Sopra I Carboni Fossili dei Terreni Miocéni delle Maremme Toscane, Memoria del Prof. Cav. Paolo Savi. Pisa, 1843. 8vo.—*From the Author.*

Relazione de' Fenomeni presentati dai Terremoti di Toscana dell' Agosto, 1846, e considerazioni teoretiche sopra i medesimi del Prof. Cav. Paolo Savi. Pisa, 1846. 8vo.—*From the Author.*

Sulla Constituzione Geologica dei Monti Pisani, Memoria del Prof. Cav. Paolo Savi. Pisa, 1846. 8vo.—*From the Author.*

ADDITIONS TO THE LIBRARY BY PURCHASE.

Annales de Chimie et de Physique. Tome XIX. Avril, 1847. Tome XX. Mai, 1847. 8vo.

Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences. Tome XXIV. Nos. 13 à 17. 4to.

The London, Edinburgh, and Dublin Philosophical Magazine, and Journal of Science. No. 202. May, 1847. Vol. XXX. 8vo.

Astronomische Nachrichten. Nos. 593 to 596, inclusive. 4to.

The Committee (Professor Frazer, Dr. Patterson, and Mr. Walker) appointed to examine Mr. Wm. M'Ilvaine's supplement to his Perpetual Calendar, recommended its publication in the Transactions of the Society.

Dr. Patterson announced the death of Professor Thomson, a member of the Society, who died at Frederick, on the 18th June, in the 70th year of his age.

On motion of Dr. Patterson, Professor Henry Reed was requested to prepare an obituary notice of Professor Thomson, which was agreed to.

Prof. Frazer, Reporter, laid before the Society No. 38 of the Proceedings of the Society.

On motion of Dr. Patterson, the communication of Mr. W. D. Lewis was referred to a Committee, consisting of Judge Kane, Col. Biddle and Dr. Chapman.

Pending nomination, No. 197, was read.

The requisite number of qualified voters not being present, the balloting for new members was postponed.

On motion of Mr. Ord, the University of Pisa was admitted among the correspondents of this Society.

Stated Meeting, August 20.

Present, fourteen members.

Dr. CHAPMAN, President, in the Chair.

Letters were announced and read:—

From the Royal Geographical Society of London, dated London, 27th April, 1847, acknowledging the receipt of the Transactions of this Society:—

From the Secretary of the Commonwealth of Massachusetts, dated Boston, 13th July, 1847, offering to present to this Society a copy of the Map of the Commonwealth of Massachusetts, published by authority:—

From Prof. A. D. Bache, dated Thompson's Station, near Gloucester, Mass., 13th August, 1847, on transmitting a communication from Professor Rümker:—

From the Perpetual Secretary of the First Class of the Royal Institute of the Netherlands, in relation to Prizes instituted and to be instituted by that body:—

From Prof. Henry Reed, dated Bordentown, N. J., 13th August, 1847, accepting the duty of preparing an obituary notice of Prof. Thomson:—

From Messrs. Osgood & Co. of New York, dated 24th July, 1847, offering to devote a column of the Literary World to a notice of the Proceedings of this Society: and,—

From Mr. R. A. Tilghman, dated London, August 3d, 1847, accompanying a communication for the Society, and acknowledging the receipt of notice of his election as a member.

The following donations were announced:—

FOR THE LIBRARY.

Inquiries respecting the History, Present Condition and Future Prospects of the Indian Tribes of the United States. 4to.—***From the War Department, Washington.***

The Quarterly Journal of the Geological Society of London. Edited by the Assistant Secretary of the Geological Society. No. 10. May 1, 1847. 8vo.—*From the Geological Society.*

Monthly Notices of the Royal Astronomical Society of London. Vol. VII. April and May, 1847. Nos. 14 and 15. 8vo.—*From the Society.*

Magnetical and Meteorological Observations made at the Royal Observatory, Greenwich, in the year 1844: under the direction of George Biddell Airy, Esq., M. A., Astronomer Royal. London, 1847. 4to.—*From the Royal Society.*

The Journal of the Royal Geographical Society of London. Vol. XVII. 1847. Part I. 8vo.—*From the Society.*

O Auxiliador da Industria Nacional, Nova Serie. Vol. I. No. 11. Abril de 1847. 8vo.—*From the Society.*

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. III. May and June, 1847. No. 9. 8vo.—*From the Academy.*

Journal of the Franklin Institute of the State of Pennsylvania. Vol. XLIV. No. 259. Third Series. Vol. XIV. July, 1847. No. 1. 8vo.—*From the Institute.*

The African Repository and Colonial Journal. Vol. XXIII. August, 1847. No. 8. 8vo.—*From the American Colonization Society.*

Minutes of the General Assembly of the Presbyterian Church in the United States of America. The concluding part of Vol. XI. A. D. 1847. 8vo.—*From the Clerk of the Assembly.*

Proceedings of the National Medical Conventions, held in New York, May, 1846, and in Philadelphia, May, 1847. 8vo.—*From Dr. Isaac Hays.*

The Medical News and Library. Vol. V. August, 1847. No. 56. 8vo.—*From Messrs. Lea & Blanchard.*

Annual Report of the Regents of the University of the State of New York. Made to the Legislature, April 24, 1847. 8vo.—*From the Regents.*

The American Journal of Science and Arts. Conducted by Prof. B. Silliman and B. Silliman, Jr. and J. D. Dana. Second Series. Vol. IV. July, 1847. No. 10. 8vo.—*From the Editors.*

The Annals and Magazine of Natural History, including Zoology, Botany and Geology. Vol. XVIII. Nos. 121 and 122. Vol. XIX. Nos. 123, 128, 129 and 130. 8vo.—*From Sir William Jardine, Bart.*

Elementare Darstellung der Analyse der Fixstern-Bedeckungen des

Herrn Geheimen Rath Bessel. Von C. Rümker. Hamburg, 1847. 4to.—*From Professor Rümker.*

Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, which merit the notice or require the attention of American Agriculturists. By William Darlington, M. D. Philadelphia, 1847. 12mo.—*From the Author.*

A Brief Notice of the Life, Researches and Discoveries of Friedrick Wilhelm Bessel. By Sir J. F. W. Herschel.

ADDITIONS TO THE LIBRARY BY PURCHASE.

Scientific Memoirs. Edited by Richard Taylor, F. S. A. Vol. V. Part XVII. May, 1847. 8vo.

The London, Edinburgh, and Dublin Philosophical Magazine. Vol. XXX. Nos. 203, 204 and 205. June and July, 1847. 8vo.

Astronomische Nachrichten. Nos. 597 to 603, inclusive. 4to.

The Edinburgh New Philosophical Journal. Conducted by Professor Jameson. No. 85. April to July, 1847. 8vo.

A communication from Mr. Richard A. Tilghman, on the Decomposing Power of Water at high temperatures, was read and referred to a Committee, consisting of Prof. Frazer, Dr. Bache and Dr. Patterson.

A communication was read from Professor Rümker, containing his latest observations on the planet Astræa, and also his observations on the Comet lately seen.

My dear Sir,—I take the liberty of sending you herewith the second part of my treatise on occultations of fixed stars, with a few copies for distribution.

I take the opportunity of communicating to you my latest observations of the planet Astræa.

1847.	Mean Hamb. Time.	Apt. A. R. of ☿	Apt. Dec. of ☿	Observations.
	h. m. s.	° ′ ″	° ′ ″	
March 22,	15 1 10.5	241 52 52.7	—13 41 39.4	17
April 11,	15 13 20.0	241 28 43.3	12 41 5.6	19
13,	13 15 45	241 17 8.8	12 34 15.8	30
20,	13 14 49	240 22 6.3	12 7 54.6	10
21,	13 9 23	240 12 41.8	12 4 11.0	19
23,	14 33 43	239 52 13.2	11 56 12.2	14
May 7,	12 10 46	237 3 23.0	11 3 46.3	10
9,	11 55 58.1	236 36 14.8	10 56 59.6	10
10,	12 9 44.1	236 22 15.2	10 53 24.0	18
11,	12 3 23.0	236 8 18.0	10 50 25.8	5
	12 28 0.4	236 8 6.2	10 50 11.8	Mer. Cir.
13,	11 11 53.1	235 40 47.8	10 43 51.0	15
15,	11 7 3.1	235 12 35.5	10 37 40.1	9
16,	12 3 40.7	234 57 52.2		Mer. Cir.
	13 11 13.6	234 57 14.8	10 34 30.1	8
21,	11 39 23.4	233 48 15.1	—10 21 11.0	Mer. Cir.
24,	11 24 53.1	233 7 28.9	10 14 31.4	Mer. Cir.
	12 12 9.9	233 7 12.0	10 14 12.0	7

I join here my observations of the Comet lately seen.

1847.	Mean Time, Hamburg.	Apt. A. R. of ☄	Apt. Dec. of ☄
May 18	11h. 4m. 46.9s.	150° 31′ 0.8″	+39° 20′ 47.1″
19	11 6 44.0	150 29 27.4	39 35 32.3
21	12 50 2.0	150 27 24.4	40 5 50.8
22	12 41 40	150 25 16.6	40 20 30.0

Mr. Niebour, assistant at the Hamburg Observatory, has thence computed:

Perihelion passage, June 18d.08925 mean Greenwich time.

Longitude of { Perih. 135° 2′ 29″ ; ☊ 173 27 53 } Apt. eq. March 19.

Inclination, 80 36 22

Log. Perih. Dist. 0.3209050

Motion retrograde.

Believe me, dear Sir,

Yours, very faithfully,

C. RÜMKER.

To Prof. A. D. Bache,

Sec. of the American Phil. Society.

Mr. M'Culloh made some observations on the application of polarized light to chemical analysis.

After alluding briefly to the discovery of the property of circular polarization in quartz, by M. Arago, and to the subsequent investigation, by M. Biot, of the laws of that phenomenon, as exhibited by certain liquids as well as by quartz, Mr. M'Culloh remarked, that but few analytical chemists seem to have availed themselves of the advantages which circular polarization presents for the extension of chemical knowledge. They appear to have considered its application to practical purposes beset with laborious algebraic calculations, and troublesome manipulations. And some who have only made a few imperfect analysis by this optical method of M. Biot, have even ventured to assert that simpler and quicker methods of attaining the same results are very desirable; while others have doubted the exactness of optical analysis, rather from want of sufficient evidence or information on the subject, than from any positive reason for disbelief.

His attention had been particularly devoted to this subject, in consequence of a very extensive series of chemical researches in relation to the manufacture of sugar, and the chemical nature of the cane and its various products; which researches were made by him under the superintendence of Prof. A. D. Bache, and the direction of the Secretary of the Treasury, in obedience to an act of Congress. In the performance of these researches, he had also been assisted by Mr. Reynolds, an able young chemist of this city. They were designed to obtain information for the use of the government, and indirectly to promote the sugar industry of our country. Several hundred saccharine substances were carefully analyzed; and the processes of manufacture and refining in Cuba and the United States were fully examined. The practical results thus obtained, constitute the subject of a report made to the Secretary of the Treasury, and by him communicated to the Senate at the close of the last session of Congress.

Incidentally, these investigations had served to throw light upon matters of a purely scientific nature; which had, therefore, been omitted, as inappropriate in the report to Congress; but which, for that very reason, were proper subjects for the attention of this Society.

He had referred to his labours thus particularly, that he might justify himself in presuming to pronounce incorrect the opinions of chemists of acknowledged reputation and skill. And he thought

that, after having been constantly occupied, for nearly two years, in making chemical investigations by means of polarized light, he might venture to speak with some confidence upon these matters, without being guilty of immodesty.

With reference to the objection, that the mathematical calculations are troublesome, he observed, that they are perfectly simple, and may be performed by mere arithmetical multiplication, division, &c.; that logarithms facilitate them; and that, by varying only the substance, all other circumstances being constant, the calculations of a series of optical results become as short and as easy as those of quantitative analysis made by the ordinary dry and humid methods with the common balance.

As the result of the experience of Mr. Reynolds and himself, after many hundred analyses, he stated, that five or six independent and complete analyses may be made in a day by a single person, and that by introducing method into all the manipulations, even a larger number may readily be performed. He, therefore, believed that no objection of time can be urged against such analyses; nor would any one familiar with the manipulations of modern analytical chemistry find just cause to complain of those of optical examinations after a few days practice.

Of the accuracy of quantitative determinations by circular polarization, he observed that the theory of the method is based upon rigid mathematical deduction, and is, therefore, perfectly exact; all possible errors are consequently those of observations only. The mean error of reading an angle of rotation, with the apparatus he had employed, does not exceed one-tenth of a degree, which for solutions of sugar corresponds to 0.002, or two-tenths of a per cent. The most exact assays of gold or of silver, by the humid method of Gay Lussac, made by experienced assayers at the mint of the United States, with balances far more delicate than those employed by analytical chemists, are affected with a probable error of 0.0002, plus or minus. Hence optical determinations compare advantageously with the results of ordinary analysis. That such determinations are fully entitled to confidence, is also proved by checking them with other methods, and especially that of applying them to known synthetical mixtures.

In conclusion, Mr. M'Culloh remarked, that he had for some time been prevented, by official and other duties, from completing a series of experimental researches with reference to the effects of temperature upon the phenomena of circular polarization, and also concerning the

nature of the union, whether chemical or mechanical, which takes place when solid substances are dissolved in water, alcohol and other liquids. He hoped, however, to be able to present these investigations in a definite form to the Society before long. And he considered the subject one full of interest and importance, by reason of its intimate connexion with the molecular forces and constitution of matter, and its relation to certain recently discovered electro-dynamical phenomena.

On motion of Dr. Patterson, the Proceedings of the Society for the present year were directed to be sent to the publisher of the Literary World, New York.

Pending nomination, No. 197, and new nominations, Nos. 198—201, were read.

Stated Meeting, September 17.

Present, twenty-three members.

Dr. CHAPMAN, President, in the Chair.

Mr. Townsend, a member of a corresponding society, was introduced.

A letter was received and read:—

From the Royal Bavarian Academy of Sciences, dated Munich, 24th of April, 1847, acknowledging the receipt of Transactions and Proceedings of this Society, and of Dr. Dunglison's Public Discourse on Mr. Du Ponceau.

The following donations were announced:—

FOR THE LIBRARY.

Report of the Sixteenth Meeting of the British Association for the Advancement of Science; held at Southampton, in September, 1846. London, 1847. 8vo.—*From the British Association.*

Abhandlungen der Mathematisch-Physikalischen Classe der Kœniglich Bayerischen Akademie der Wissenschaften. Vierter Band die Abhandlungen von den Jahren 1844–46, enthaltend. München, 1846. 4to.—*From the Royal Academy of Munich.*

Bulletin der Kœnigl. Akademie der Wissenschaften. Nos. 6 to 77, inclusive. 4to.—*From the same.*

Gelehrte Anzeigen, herausgegeben von Mitgliedern der K. Bayer. Akademie der Wissenschaften. Vols. 16 to 23, inclusive, for the Years 1843 to 1846. 4to.—*From the same.*

Almanach der Kœniglich Bayerischen Akademie der Wissenschaften für das Jahr, 1847.—*From the same.*

Die Ueberbleibsel der Altägyptischen Menschenraçe. Eine Abhandlung gelesen in der öffentlichen Sitzung der K. Academie der Wissenschaften zu München am 24 August, 1846. Von Dr. Franz Pruner. München, 1846. 4to.—*From the same.*

Journal Asiatique, ou Recueil de Mémoires, d'Extraits, et de Notices relatifs à l'Histoire, à la Philosophie, aux Langues, etc. etc., des Peuples Orientaux. Quatrième Série. Tome IX. Nos. 42 et 43. Mars et Avril, 1847. 8vo.—*From the Asiatic Society of Paris.*

Annals of the Lyceum of Natural History of New York. Vol. IV. July, 1847. Nos. 10 and 11. 8vo.—*From the Lyceum.*

Journal of the Franklin Institute of the State of Pennsylvania. Vol. XLIV. Nos. 260, 261. Third Series. Vol. XIV. August and September, 1847. 8vo.—*From the Institute.*

The Annals and Magazine of Natural History, including Zoology, Botany, and Geology. Vol. XX. No. 131. August, 1847. 8vo. *From Sir Wm. Jardine, Bart.*

The African Repository and Colonial Journal. Vol. XXIII. September, 1847. No. 9. 8vo.—*From the American Colonization Society.*

The Medical News and Library. Vol. V. September, 1847. No. 57. 8vo.—*From Messrs. Lea & Blanchard.*

On Terrestrial Magnetism. By W. A. Norton. From the American Journal of Science and Arts, Vol. IV.—*From the Author.*

On Balances. By Franklin Peale. From the Journal of the Franklin Institute. 8vo.—*From the Author.*

ADDITIONS TO THE LIBRARY BY PURCHASE.

Annales de Chimie et de Physique. Troisième Série. Tome XX. Juin, 1847. 8vo.

Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences. Tome XXIV. Nos. 18 à 25. 4to.

The London, Edinburgh, and Dublin Philosophical Magazine, and Journal of Science. Vol. XXXI. No. 206. 8vo.

Astronomische Nachrichten. No. 604. Altona, July 15, 1847. 4to.

The Committee on Mr. R. A. Tilghman's paper, "On the Decomposing Power of Water at High Temperatures," reported, recommending its publication in the Transactions of the Society, which was ordered accordingly.

From the long known fact that solutions of salts, which require a high temperature for dehydration, frequently underwent partial decomposition before this end was effected, Mr. Tilghman was led to believe, that by exposing the salt, even in its anhydrous state, to a high heat, and passing over it a current of aqueous vapour at the same temperature, these salts might be completely decomposed, and perhaps the action observed even in those which had given no signs of partial decomposition under the treatment before alluded to. Upon trying the experiment, it was found that the anhydrous chlorides of calcium, strontium, and barium, could be rapidly decomposed by exposing them, at a high red heat, to a current of steam; hydrochloric acid being copiously evolved, and the oxides of the metals left, the lime remaining anhydrous from the intensity of the heat employed, while the baryta and strontia passed to the state of hydrates.

In these haloid salts, it is to be observed that the addition of the elements of water is absolutely essential to the decomposition; as neither the hydrogen of the acid, nor the oxygen of the base, existed in the anhydrous salt. The action is, therefore, the result of a double decomposition between the steam and the chloride, as well as of the affinity of the liberated acid and base for water. The experiments were then extended to the oxysalts, the sulphates of magnesia, lime, strontia and baryta, which contain, even when anhydrous, all the elements generally considered necessary for the separate existence of the acid and bases of which they are composed. The application of the strongest heat causes no liberation of their acid; but, as with the chlorides, this effect is immediately produced by the passage of a current of steam over them at a high temperature, the baryta and strontia being left in the state of hydrates, and the other bases anhydrous.

The intensity of the affinity between the acid and base of the respective salts, is curiously illustrated by the gradual increase of heat necessary for their decomposition by aqueous vapour. Thus sulphate of magnesia gives off its acid to steam at a low red heat, and consequently a large portion of the acid may be condensed in an undecomposed state.

The sulphate of lime requires a high red heat for its decomposition; and on this account the greater part of its acid is resolved into

sulphurous acid and oxygen gas. The decomposition of the sulphates of strontia and baryta requires progressively higher heats, which, in the case of the last salt, must be raised even to low whiteness.

The subphosphate of lime, as it contains an acid much less volatile than the sulphuric, combined with an excess of a powerful base, which adds to its stability, was selected as one of the most difficult tests of this decomposing power of aqueous vapour. By a full white heat, however, its phosphoric acid was slowly disengaged, and the acid, by its white precipitate with nitrate of silver, showed that the excess of aqueous vapour had not prevented the change which heat is known to produce upon this acid.

It was found, that with the sulphates and muriates of potassa and soda, although the decomposition began freely at a red heat, yet the proportion of alkali set free never exceeded a very small per centage of the residual salt, no matter how long the operation might be continued. This peculiarity being attributed to the volatility of the hydrates of these bases at high temperatures, substances capable of forming non-volatile combinations with the alkalies were mixed with the salts, before subjecting them to the action of the heated steam; the acids were then found to be completely disengaged with facility.

Lime, magnesia, and the subphosphates and subsilicates of lime, baryta, and strontia, produce this effect; and in all these cases the chemical combination is so feeble, that, when cold, the alkali is disengaged by the solvent powers of water alone.

Alumina, which possesses so much of the acid character with respect to the strong bases, is proportionally more efficient than any of the preceding substances in aiding the decomposition of the alkaline salts; it remains in combination with the alkali, when cold, as a soluble aluminate, but is easily precipitated by a current of carbonic acid gas. The fact, long since noticed by Berthier, that the mixture of alumina and sulphate of potassa, formed by the calcination of potash-alum, is converted by heat into aluminate of potassa, was shown to depend, probably, upon the presence of aqueous vapour. When the experiment was repeated, and the presence of this vapour carefully avoided, no decomposition of the sulphate of potassa took place; but by the contact of the vapour produced by the combustion of the fuel or otherwise, even in small quantity, and at much lower temperatures, the decomposition is produced rapidly.

The powerful action of aqueous vapour upon anhydrous alum, at a high temperature, suggested the possibility that a similar action might take place upon its mineral representative—feldspar. Steam

was therefore passed slowly, for some time, over small fragments of highly heated feldspar. Beyond parted fusion, no other visible change than a considerable degree of vesicularity in the parts most exposed was produced; but when the fragments were finely pulverized and boiled in water, the concentrated solution was strongly alkaline, and proved, by the usual tests, to consist of aluminate of potassa; and after water ceases to extract this salt from the powdered mineral, dilute sulphuric acid will produce from the residue a small proportion of alum. It is worthy of remark, that although the contact of the steam in this experiment is confined to the mere surface of the small fragments of feldspar, yet the chemical decomposition produced by it is not confined to that surface, but spreads by a "cementation action" through their entire mass; pulverization is therefore required to obtain evidence of the internal change which has been produced.

All the experiments so far made, would indicate that the following was the general rule applicable to all salts capable of sustaining heat alone without decomposition.

Whenever a salt, from its own elements alone, or by the addition of those of water, can produce a volatile acid and a fixed base, the evolution of this acid and the liberation of this base will be determined by passing a current of aqueous vapour over the salt, raised to a high temperature. When either the acid or the base to be liberated forms a combination with water, which can resist decomposition by the heat employed, the tendency to form such hydrates adds much to the decomposing power of the aqueous vapour. Although potash and soda are not, by themselves, fixed bases at high temperatures, yet, by the use of the substances before mentioned, they can form combinations which are fixed, and by this means these salts come under the above rule.

The actual number of salts which have been as yet subjected to this mode of decomposition is not very large; yet from their perfect analogy of composition with many others, there can be but little doubt of the general extension of the principle.

The applicability of this simple mode of decomposition to the explanation of a great variety of geological changes, is too evident to escape the attention of those conversant with that science. The author expresses the hope to be able, in a future paper, to give a more complete account of some interesting facts which have been observed in connexion with this subject, and to verify, by experiment, many points which must at present be left to inference and conjecture.

Mr. Ord announced the death of Dr. George M. Zecchinelli, of Padua, a member of this Society.

Mr. G. W. Smith stated that the singing mouse, which was discovered some weeks ago in the Northern Liberties, county of Philadelphia, was in the Librarian's room, and invited the members to listen to it after the adjournment of the Society. There does not appear to be any difference of external form between this and the common mouse.

Prof. Haldeman exhibited a specimen of a spider (lycosa scutulata), from which, when stuck with a pin, and in the act of dying, a parasitic worm of the genus Filaria, three times the length of the spider, proceeded.

Pending nominations, Nos. 197 to 201, inclusive, were read.

On motion of Prof. Frazer, permission was granted to the brother of Mr. Richard A. Tilghman to make a copy of the paper upon the decomposing power of water at a high temperature, for his own private use.

On motion of Mr. Ord, the Franklin Institute of Philadelphia was put upon the list of exchanges of this Society.

Stated Meeting, October 1.

Present, twenty-five members.

Dr. PATTERSON, Vice-President, in the Chair.

Letters were received and read:—

From the Literary and Philosophical Society of Manchester, England, dated Manchester, 3d August, 1847, acknowledging the receipt of the Transactions of this Society: and,—

From Baron Von Hammer Purgstall, dated Vienna, 19th March, 1847, acknowledging the receipt of the Proceedings of this Society, and announcing a donation.

The following donations were announced:—

FOR THE LIBRARY.

Journal Asiatique, ou Recueil de Mémoires, d'Extraits et de Notices relatifs à l'Histoire des Peuples Orientaux, etc. etc. Quatrième

Série. Tome IX. No. 44. Mai, 1847. 8vo.—*From the Asiatic Society of Paris.*

The American Journal of Science and Arts. Conducted by Prof. Silliman and B. Silliman, Jr. and J. D. Dana. Vol. IV. No. 11. Sept. 1847. 8vo.—*From the Editors.*

Jahrbücher der Literatur. Hundert dreizehnter Band. January to December, 1846. Nos. 113 to 116, inclusive. Wien. 8vo.—*From Baron Von Hammer Purgstall.*

An Essay, Literary and Practical, on Inversio Uteri. By John Green Crosse, M.D., F.R.S. Part the Second. London, 1847. 8vo.—*From the Author.*

Chemistry applied to the Manufacture of Soap and Candles. By Campbell Morfit. Philadelphia, 1847. 8vo.—*From the Author.*

ADDITIONS TO THE LIBRARY BY PURCHASE.

The London, Edinburgh, and Dublin Philosophical Magazine, and Journal of Science. Third Series. Vol. XXXI. No. 207. Sept. 1847. 8vo.

Annales de Chimie et de Physique. Troisième Série. Tome XX. Juillet et Août, 1847. 8vo.

Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences; par MM. les Secrétaires perpétuels. Tome XXIV. No. 26. 28 Juin, 1847. Tome XXV. Nos. 1 à 4. 5 Juillet au 26 Juillet, 1847. 4to. Tables, deuxième Semestre. 1846. Tome XXIII.

Mr. Haldeman exhibited specimens of engravings of shells on steel, intended for the publication of the results of the Geological Survey of New York. He stated that the expense was only two-fifths of similar plates on stone a few years ago.

Pending nominations, from Nos. 197 to 201 inclusive, and new nomination, 202, were read.

Stated Meeting, October 15.

Present, nineteen members.

Dr. CHAPMAN, President, in the Chair.

A letter was received and read:—

From Dr. Nürnberger, dated Nürnberg, 1st May, 1847, accompanying a donation to the Library.

The following donations were announced:—

FOR THE LIBRARY.

Proceedings of the American Academy of Arts and Sciences. Jan. 27th to May 25th, 1847. Boston. 8vo.—*From the Academy.*

The African Repository and Colonial Journal. Vol. XXIII. Oct. 1847. No. 10. 8vo.—*From the American Colonization Society.*

The American Journal of the Medical Sciences. Edited by Isaac Hays, M.D. New Series. Vol. XIV. No. 28. October, 1847. 8vo.—*From the Editor.*

The Medical News and Library. Vol. V. October, 1847. No. 58. 8vo.—*From Messrs. Lea & Blanchard.*

North American Herpetology; or, A Description of the Reptiles inhabiting the United States. By John Edwards Holbrook, M.D. Philadelphia, 1842. 5 Vols. 4to.—*From the Author.*

Memoir on the Fossil Genus Basilosaurus; with a notice of Specimens from the Eocene Green-sand of South Carolina. By Robt. M. Gibbes, M.D. Philadelphia, 1847. 4to.—*From the Author.*

Grundzüge der neueren Astronomischen Beobachtungs-Kunst. Entworfen von Dr. C. T. Anger. Danzig, 1847. 4to.—*From the Author.*

Populáres Astronomisches Hand-Wörterbuch. Von Dr. Joseph Emil Nürnberger. Zwölftes und dreizehntes Heft, L.—M. Kempten, 1846. 8vo.—*From the Author.*

On motion of Dr. Boyé, Dr. Boyé, Mr. Peale, and Dr. Bethune, were appointed a Committee to examine into the phenomena presented by the singing mouse, which was recently brought before the Society.

Dr. Bethune made some remarks on ethnology, a term he preferred to ethnography.

It has generally been assumed that civilization was the result of a people's emergence by their own force and gradually from a barbarous state. This view is taken by various writers, especially the French, on the *contrat social*, and has become the popular notion. Dr. Bethune affirmed that all history taught the contrary. We have no established instance of a nation emerging from barbarism by its own force, but always where such a change has occurred in the condition of a people, it received the *graft* of civilization from another; and there never has been a time when civilization did not exist some-

where, though often changing its place. He considered this as a proof that civilization is the natural state of man, and must have been his original state, or the state which he derived from God.

Dr. Bethune also considered that nations were distinctly characterised by their moral peculiarities, and especially by the superstitions prevalent among them. Every form of superstition is of very remote origin, and the several classes can be traced backward through successive periods to a common source; the form prevalent among any nation marking the period when it broke off from the main stem. Thus the northern Indians of America (if their faith be properly ascertained), are the only savage people known to us who worship a pure Spirit as God; and hence they must be the oldest, having left the main family before idolatry became prevalent. ***Fire*** being originally the sign of the divine Presence, the worship of fire as a representative of Diety was the ***earliest*** form of idolatry, and marks a people among whom it prevails as very ancient in their separation. Angels in the visible shape of supernatural man, being employed by the invisible God as his messengers, gave rise to the ***second*** form of idolatry, that of ***images*** resembling man, though variously exaggerated, according to the taste of the people. The ***third*** form was the result of more philosophical refinement, being the worship of emblems, representing the various providence of the Divine Being; as the ox in agriculture; the trident or fish-spear for maritime affairs, &c. Next to the emblematic came the ***symbolical;*** as the egg, the serpent-circle, &c. This was carried to the highest pitch in the ***Bacchic*** mysteries, where, under forms revolting to modern refinement, the most subtle doctrines were concealed. It is remarkable that wherever history (other than sacred) leads us, we find traces of the Bacchic or Phallic superstition, from India to ultima Thule; from the date of the Shastres down to the present time.

Dr. Bethune inferred from this that the superstitions and ***traditionary*** moral notions of a people, should be studied as much as the form of their heads or the radical of their language, to discover their origin. The bale (or Baal) fires still lighted in Ireland, and the image of the sun on the ruined temples of the Mexicans, mark an original consanguinity of the long separated nations. So, distinct traces of the Phallic worship (as late as the middle of the last century), prove the source from which Marseilles was colonized, ***after*** that mysticism had been invented by the Egyptian hierophants.

All these considerations, leading us backward to a unity or common origin of the race, as well as to a state of high morals and civi-

lization, Dr. Bethune thought, went to confirm the Mosaic history. He also referred to the reasoning in the first chapter of the epistle to the Romans, to show that his view was that taken by the apostle Paul. He also hoped to investigate the subject farther and communicate the result in form.

Pending nominations, from No. 197 to 202, were read.

The requisite number of qualified voters not being present, the balloting for members was postponed.

Stated Meeting, November 5.

Present, twenty-two members.

Dr. CHAPMAN, President, in the Chair.

Letters were received and read:—

From the President of the Corporation of the University in Cambridge, Mass., dated Harvard College, Cambridge, 28th July, 1847, acknowledging the receipt of the Proceedings of this Society:—and,

From His Excellency George Bancroft, dated U. S. Legation, London, 4th October, 1847, announcing a donation to the Society.

The following donations were announced:—

FOR THE LIBRARY.

Transactions of the Royal Society of Edinburgh. Vol. XVI. Part III. Edinburgh, 1847. 4to.—*From the Society.*

Transactions of the Royal Society of Edinburgh. Vol. XVII. Part II. Containing the Makerstoun Magnetical and Meteorological Observations for 1843. Edinburgh, 1847. 4to.—*From the same.*

Proceedings of the Royal Society of Edinburgh. Vol. II. Nos. 29 and 30. 1846–47. 8vo.—*From the same.*

Monthly Notices of the Royal Astronomical Society of London. Vol. VII. June 11, 1847. No. 16. 8vo.—*From the Society.*

The Quarterly Journal of the Geological Society of London. Edited by the Assistant Secretary. No. 11. August 1st, 1847. 8vo.—*From the Society.*

The African Repository and Colonial Journal. Vol. XXIII. November, 1847. No. 11. 8vo.—*From the American Colonization Society.*

The Annals and Magazine of Natural History, including Zoology, Botany, and Geology. Vol. XX. Sept. 1847. No. 132. 8vo. *From Sir Wm. Jardine, Bart.*

Twenty-ninth Congress, 1st Session, House of Representatives. War Department. Document, No. 211. Letter from the Secretary of War, relative to the Mineral Lands on Lake Superior, accompanied with a Map. 8vo.—*From the Hon. G. M. Dallas.*

An Attempt to Discover some of the Laws which govern Animal Torpidity and Hibernation. By Peter A. Browne, LL.D. 8vo.

ADDITIONS TO THE LIBRARY BY PURCHASE.

Astronomische Nachrichten. Nos. 605, 606, 607, 608 and 609. 4to.

Dr. Patterson read a letter from A. D. Bache, LL.D., dated U. S. Coast Survey Station, near Berwick, on the subject of a certain method of determining the sun's parallax, proposed by Dr. Gerling of Masburg, and the memorial by Lieut. Gillis upon the subject.

And upon motion, the papers upon the subject were referred to a Committee, consisting of Dr. Patterson, Mr. M'Culloh, and Prof. Kendall.

Pending nominations, from No. 197 to 202, were read.

Mr. Ord moved the adoption of a substitute for chapter 1, section 10, of the Laws of the Society.

The subject was, according to the Laws of the Society, laid over until the next stated meeting.

And on motion of Judge Kane, the Librarian was requested to give notice that the enacting of laws will be part of the business of that meeting.

On motion of Judge Kane, Mr. F. Peale, one of the Curators, was authorized to withdraw from the cabinet, for a period not exceeding ten days, the manuscript of the Declaration of Independence, the Jefferson Chair, and the portrait of Mr. Jefferson, for the purpose of placing them for that time in the collection about to be opened for exhibition at the hall of the Musical Fund Society, for the benefit of the society.

On motion of Mr. G. Washington Smith, the Librarian, and Curator, Mr. Peale, were authorized to take measures for the preservation of the MSS. of the Declaration of Independence.

Stated Meeting, November 19.

Present, twenty-three members.

Dr. CHAPMAN, President, in the Chair.

A letter was received and read:—

From the Perpetual Secretary of the Royal Academy of Sciences and Belles-Lettres of Brussels, dated Brussels, 8th October, 1847, acknowledging the receipt of the Proceedings and Transactions of this Society.

The following donations were announced:—

FOR THE LIBRARY.

The American Journal of Science and Arts. Second Series. No. 12. November, 1847. 8vo.—*From the Editors.*

The Annals and Magazine of Natural History, including Zoology, Botany, and Geology. Vol. XX. No. 133. October, 1847. 8vo.—*From Sir Wm. Jardine, Bart.*

The Medical News and Library. Vol. V. November, 1847. No. 59. 8vo.—*From Messrs. Lea & Blanchard.*

An Address delivered before the Chester County Horticultural Society, at West Chester, Pa. September 10, 1847. By Wm. H. Dillingham. 8vo.—*From the Chester County Horticultural Society.*

Address delivered at the opening of the New Hall of the Athenæum of Philadelphia, on Monday, October 18, 1847. By Thomas I. Wharton, Esq. 8vo.—*From the Author.*

ADDITIONS TO THE LIBRARY BY PURCHASE.

The London, Edinburgh, and Dublin Philosophical Magazine, and Journal of Science. Third Series. No. 208. October, 1847. 8vo.

The Edinburgh New Philosophical Journal. Conducted by Prof. Jameson. No. 86. Vol. XLIII. April—October, 1847. 8vo.
Astronomische Nachrichten. Nos. 610 and 611. 4to.

Dr. Franklin Bache announced the death of the Hon. Alexander Everett, a member of this Society, on the 29th of June last.

A letter was read from Richard Owen, Esq. to the Hon. Edward Everett, President of the University of Cambridge, Mass., containing some remarks upon Dr. Meigs' paper on the generation of Didelphis Virginiana, and expressed his desire to obtain a specimen of a gravid female of this species for the Hunterian Museum.

Dr. Meigs made some remarks upon this letter, defending his belief that the young opossum is developed from a placenta.

Dr. Dunglison made some remarks upon the same subject, agreeing with Prof. Owen.

Prof. Frazer read an extract from a letter of Prof. Mitchell, of Cincinnati, stating that he believed he had obtained two positions of Lassel's satellite of Neptune, nearly 180° apart, and with an interval of about six days.

Pending nominations, from No. 197 to 202, were read.

Mr. Ord called for the consideration of the by-laws prepared by him at the last meeting, which being ordered, the substitute offered by him in place of chapter I., section X. of the Laws of the Society, was unanimously adopted, (twenty-three members voting in the affirmative,) as follows, viz:—

"Such members as reside within ten miles of the Hall of the Society, and such others as desire to vote at the meetings and elections, shall pay an admission fee of ten dollars; and annually thereafter, on the first Friday of January, a contribution of ten dollars; but should the annual contribution be not paid on or before the third Friday in July, then shall ten per centum be added to the same for each and every year that it shall remain unpaid."

Stated Meeting, December 3.

A. D. Bache, LL.D., Vice-President, in the Chair.

Present, thirty-four members.

Dr. Bache introduced Major Sanders, of the corps of Engineers, to the presiding officer.

Letters were received and read:—

From the Royal Academy of Sciences of Berlin, dated 26th July, 1847, and 15th August, 1847, announcing a donation to the Society, and acknowledging the receipt of Proceedings and Transactions of the Society: and,—

From the Royal Institute of Sciences, Belles-Lettres and Arts of the Low Countries, dated Amsterdam, 24th August, 1847, acknowledging the receipt of Transactions and Proceedings of the Society.

The following donations were announced:—

FOR THE LIBRARY.

Nouveaux Mémoires de l'Académie Royale des Sciences et Belles-Lettres de Bruxelles. Tome XIX. 1845. Tome XX. 1847. 4to.—*From the Academy.*

Mémoires Couronnés et Mémoires des Savants Étrangers, publiés par l'Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique. Tome XIX. 1845 and 1846. Tome XX. Tome XXI. 1846. 4to.—*From the same.*

Bulletins de l'Académie Royale des Sciences et Belles-Lettres de Bruxelles. Tome XII. 2me Partie. 1845. Tome XIII, en deux Parties. 1846. Tome XIV. 1re Partie. 1847. 8vo.—*From the same.*

Annuaire de l'Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique. Douzième Année, 1846. Treizième Année, 1847. 12mo.—*From the same.*

Abhandlungen der Königlichen Akademie der Wissenschaften zu Berlin. Aus dem Jahre, 1845.—*From the Academy.*

Bericht über die zur Bekanntmachung geeigneten Verhandlungen der Königl. Preuss. Akademie der Wissenschaften zu Berlin. July to December, 1846. January to June, 1847. 8vo.—*From the same.*

Annales de l'Observatoire Royal de Bruxelles, publiées aux frais de l'État, par le Directeur, A. Quetelet. Tome V. 4to.—*From the Director, A. Quetelet.*

Annuaire de l'Observatoire Royal, par le Directeur, A Quetelet. 1846 et 1847. 18mo.—*From the same.*

Boletin de la Sociedad Economica de Valencia. Año 8°. Tomo 4°. Julio, Marzo, 1847. 8vo.—*From the Society.*

Journal of the Franklin Institute of the State of Pennsylvania. Vol. XLIV. Nos. 262, 263. Third Series. Vol. XIV. Oct., Nov., 1847. No. 11. 8vo.—*From the Institute.*

Proceedings of the Historical Society of Pennsylvania. Vol. I. June, 1847. 8vo.—*From the Society.*

Observations des Phénomènes Périodiques. Par A. Quetelet. Extracted from the 19th and 20th volumes of the Brussels Academy. 4to.—*From the Author.*

De l'Influence du Libre Arbitre de l'Homme sur les Faits Sociaux, et particulièrement sur le nombre des Mariages. Par M. A. Quetelet. Extrait du Tome III. du Bulletin de la Commission centrale de Statistique. 4to.—*From the Author.*

Sur les Anciens Recensements de la Population Belge. Par M. A. Quetelet. Extrait du Tome III. du Bulletin de la Commission centrale de Statistique de Belgique. 4to.—*From the Author.*

Enquête sur le Travail et la Condition Physique et Morale des Ouvriers employés dans les Manufactures de Coton, à Gand. Par M. M. J. Mareska, et J. Heyman. 8vo.—*From M. Quetelet.*

Mémoire sur les Étoiles Filantes, ainsi que sur les Météores en général, par rapport à leurs causes déterminantes. Par Thomas Ignace Marie Forster. 8vo.—*From M. Quetelet.*

Chronicles of the First Planters of the Colony of Massachusetts Bay, from 1623 to 1636. Now first collected from original Records and contemporaneous Manuscripts, and illustrated with Notes. By Alexander Young. Boston, 1846. 8vo.—*From the Author.*

Chronicles of the Pilgrim Fathers of the Colony of Plymouth, from 1602 to 1625. Now first collected from original Records and contemporaneous printed Documents, and illustrated with Notes. By Alexander Young. Second Edition. Boston, 1844. 8vo.—*From the Author.*

Revolutionary Services and Civil Life of General William Hull; prepared from his Manuscripts, by his Daughter, Mrs. Maria Campbell. Together with the History of the Campaign of 1812,

and Surrender of the Post of Detroit; by his Grandson, James Freeman Clarke, New York. 1848. 8vo.—*From the Editor.*

The Medical News and Library. Vol. V. Dec. 1847. No. 60. 8vo.—*From Messrs. Lea & Blanchard.*

Report of the Organization Committee of the Smithsonian Institution. Report of the Board of Regents, submitted to Congress, of the Operations, Expenditures, and Condition of the Smithsonian Institution.—*From T. R. Peale, Esq.*

Professor Henry presented a communication from Mr. T. Allen, entitled "An account of the inflammable Gas-wells on the banks of the Kanawha river, in Virginia, as they appeared in June, 1847," which was read by the Secretary.

Mr. Allen states that the term "gas-well" is applied in that part of the country to designate certain borings or artesian wells, made to the depth of from 1000 to 1800 feet, for the purpose of procuring stronger brine than that nearer the surface, from which escape, together with the brine, large quantities of carburetted hydrogen gas, which is applied as a fuel in the process of manufacturing the salt. The boring is about 3 inches in diameter, and is fitted with a copper-pipe, from the top of which the mingled gas and liquid, forced upward by the pressure at the bottom of the well, are conveyed through wooden-pipes to a square cistern of planks, supported at a height of 10 to 12 feet above the level of the soil, for the purpose of obtaining a head for distributing the liquid to the evaporating pans. In this cistern is placed a gas-holder, made of a portion of the trunk of a hollow sycamore (buttonwood) tree, closed above by a plank top, and open below, beneath which the conducting pipe terminates. The gas and liquid at once separate, and while the latter is conducted to the salt-pans, the former accumulates in the gas-holder, and is conveyed through a wooden pipe from its top to the furnace chamber, where it is distributed through iron-tubes inserted in the masonry. The furnace chamber is about 100 feet in length, and 5 or 6 feet wide, furnished below with an ordinary grating to admit air, (the supply of which is regulated by flat stones covering more or less of the openings), and closed above by the bottoms of the cast iron salt-pans. The gas being specifically lighter than the air, rises and occupies the upper portion of the chamber in contact with the pans, but burns only at its lower surface where it is in contact with the air; thus furnishing a sheet of flame suspended midway of the height of the cham-

ber. The evaporating pans are fitted with wooden covers, and the vapour escaping from them is conducted through pipes passing through the cisterns before spoken of, and by its condensation furnishes a large quantity of perfectly soft water. The excess of the gas is used as fuel under the boiler of a steam engine employed in boring another well, and for the purposes of lighting up the establishment at night.

In the works from which the description was taken, 450 bushels of good merchantable salt are made daily, and can be sold at 18 cents per bushel. It is not every brine-well, however, which furnishes the gas; nor is the supply unlimited, since the first gas-well has entirely given out. The temperature of the water from all these wells is the same as that of the coldest spring water, which contrasts singularly with the phenomena found in corresponding borings in Europe, such as the well at Grenelle, the temperature of whose water is 85°, and the observed increment below the point of constant temperature, 1° for every 50 feet.

Mr. Allen attributes the rise of the water to the hydrostatic pressure in subterranean currents extending from the tops of the surrounding mountains; the gas he supposes to be developed during the conversion of the bituminous coal (with which the region abounds) into coke, graphite and anthracite; the coldness of the water he attributes to the solution of the salt. The borings are through soft, crumbling sandstone, into which the drills penetrate easily and perforate a channel like a tube of stone. They are usually 2¾ or 3 inches diameter, and to prevent the infiltration of the upper weaker brine, are lined with a copper tube of about 2 inches diameter, made continuous by being tightly united by screw-joints of cast brass, and with a strip of leather around the lower end to make the tube fit tight to the bore of the drill hole. The contract price for boring to the depth of 1000 feet, is $2.50 per foot, the necessary steam-power being furnished, and six months allowed to execute the work.

The drilling apparatus consists of "auger-rods," as they are termed, made of round pieces of oak of about 2 inches diameter, and often 20 feet long, the sections being united by iron screw-joints. The bottom sections of the auger-rods are made of iron, terminated with a steel drill, this heavy metal being used to cause the descent of the wooden rods in the water that usually fills the drill-hole. The lower iron rods are for this reason called by the workmen "sinkers."

The lowest steel-pointed section of the auger-rod is formed with an open slit at the end of its junction with the section next above it, in-

stead of being connected by a fast screw-joint. This contrivance allows of the descent of the great length of several hundred feet of the auger-rod, without expending its whole momentum upon the drill, which is thus always allowed to fall with the uniform force of its own weight alone, there being sufficient scope in the length of the slit to allow the weight of the auger-rod to become arrested by the elastic rope employed to lift and drop it, to produce the desired churning movement.

Professor Bache left the chair, which was taken by Dr. Patterson.

Professor Bache then communicated a description of a base apparatus, planned by him and executed by Mr. Wm. Wardeman, mechanician of the coast survey.

The base apparatus presented some novel feature in construction, the adaptation of others not hitherto used in field work, and a choice of parts previously used by others. The general plan was devised by me, and the details by Mr. William Wardeman, mechanician of the coast survey, by whom they were executed under my direction. The following are the general features of the apparatus. 1. The measuring bars were upon the compensating system first used, I believe, by Col. Colby in Great Britain, and by Mr. Borden in the United States, but the mode of obtaining the compensation differed entirely from that used by either of these gentlemen. 2. A principle was introduced in reference to the dimensions of the bars which, if at all recognised, has not been hitherto applied. A bar of brass and a bar of iron of the same dimensions, exposed to the same source of heat, will not heat equally in equal times; this is well known to depend upon the different conducting powers of the two metals, their different specific heats, and the different powers of their surfaces to absorb heat. The bars then, if of equal sections, when the temperature is rising or falling, have not the same temperature, and the system is not compensating. The surfaces are easily made to absorb equally by the same coating, and the sections must be so proportioned to each other that the bars will have the same temperature when exposed to variable temperatures of the atmosphere and of the case containing them. Having arranged the sections approximately, using numbers taken from the books, the change, in length, during increase or decrease of temperature, were not perceived when microscopes were used supported upon wooden stands, or even upon stone blocks of small size; the means of measurement were not sufficiently delicate to perceive

them, or they were masked by greater changes in the supports. When the level of contact was substituted for the microscopes, or when Mr. Saxton's reflecting pyrometer was employed, these changes became very perceptible, and it was necessary to resort to direct experiment upon the materials of the bars themselves to obtain even approximate results, and then to correct a small residual quantity by applying a covering more absorbent of heat to one bar than to the other. If such changes have not been perceived hitherto, it has been because adequate means were not used to detect them. 3. The lever of contact and level, first used, I believe, in the adjustment of standard measures by Bessel, was applied to indicate the lengths of the bars. The levels were so delicate, that several divisions upon them made up a quantity entirely insignificant in the measurement. The doubt which I had was whether the sensibility of the apparatus had not been carried too far; this was, however, entirely removed upon finding the rapidity and certainty with which it could be used. The contact between two adjacent measures was between a blunt knife edge and a plane of agate. 4. The trussed support for the bars adapted to bearing the apparatus at two points only, and the tin covering or tube which surrounded the whole, were similar to those used by Mr. Borden, but differed entirely in the adaptation of them; the bars moved freely on the trussed frame upon rollers, and were not attached to the covering tube in which the trussed frame itself was merely supported. The tin covering was conical and was doubled. 5. The tressles admitted of the various motions required in placing the apparatus, and the length of the whole about twenty feet, (six metres), gave a weight which permitted easy and rapid transfer by four men, when covered with several thicknesses of imperfectly conducting material to keep the fluctuations of temperature within moderate limits. The contacts were usually made in much less time than the setting of the forward tressles for the measure. The following statistics of the measurement of a base line on Dauphin Island, at the entrance to Mobile bay, with this apparatus, will suffice for the present to show that we have obtained a useful auxiliary in a geodetic survey, especially when the difficulties of triangulation render advisable the measurement of frequent bases. The greatest length measured in the course of a day, in the final measurement, was one hundred and eighty-three tubes, equal to nearly seven-tenths of a mile; the least forty-seven, or one-quarter of a mile; the average one hundred and four tubes, or four-tenths of a mile. The whole measurement of nearly seven miles was completed in seventeen

working days, not reckoning the time lost by bad weather, or occupied by change of camp, and by comparisons of the apparatus. The length of the apparatus was compared, before and after the final measurement, with a standard iron bar with which it had been compared in the Coast Survey office, by using Mr. Saxton's reflecting pyrometer.

The accuracy with which a remeasurement of considerable length could be made was tested more than once in the measurement, but it was determined to make a more complete direct trial by establishing intermediate marks, and noting by the microtelescopes attached to the ends of the bars the deviation at intervals. The greatest deviation in the length of seventeen tubes was between one and two-hundredths of an inch, the average in cases of repetition, not regarding signs, was five one-thousandths of an inch, the final error at the end of the one-third of a mile remeasured was nothing. The probable error of remeasuring one hundred and twelve yards was less than five ten-thousandths of an inch, making on the whole length of the base, and supposing all the errors to fall in the same direction, which is physically most improbable, less than nine-tenths of an inch. The great practical difficulty found at the outset was to obtain a mark which would stand unmoved in the sand to which to refer the apparatus on recommencing a measurement; this was satisfactorily obviated after many experiments, and the marks which I have just stated to have been placed at intervals may be assumed generally to have been stationary from one measurement to another. Incidentally, this remeasurement gave a strong test of the perfect compensation of the apparatus under sudden changes of temperature, as well as for different stationary temperatures. A storm came up after the second measurement was commenced, which interrupted it for between one and two hours, and cooled the air suddenly about four degrees. The second measurement was therefore made at a lower temperature by some degrees than the first, and under expcsure to a sudden fall of temperature.

The chair having again been taken by Prof. Bache,—

Professor Henry made a communication relative to some observations on the Aurora Borealis, with the object of determining the height of the meteor. The result of the observations tended to establish the fact, that the arch of the aurora, like the rainbow, is a local phenomenon, each observer seeing a different object.

Professor Bache submitted to the Society, certain charts of the progress of the survey under his superintendence.

Dr. F. Bache reported the decease of Mr. James Ross, of Pittsburg, a member of this Society, who died on the 27th of November, 1847.

The Treasurer presented to the Society his annual report on the state of its funds.

The Committee of Publication made their annual report.

Pending nominations, from No. 197 to 202, were read.

The following communication was received by the Secretary previous to the meeting, but accidentally omitted; which being represented to the Society, they, by resolution of January, 1848, directed the paper to be inserted in the proceedings of the meeting at which it should have been read.

Corrections and Additions to his paper on the Longicornia of the United States, by S. S. Haldeman.

Since the year 1844, in which the greater portion of the former paper was prepared, a number of doubtful points have been solved, species detected, and errors discovered, which it was not practicable to insert during the publication, but which are now presented that they may bear the date of the original article, at least as far as the year is concerned. The original numbers are employed, and continued after 284, for the additional species cited.

2, 6. Orthosoma cilipes *Say*, is a Mallodon, of which M. simplicicolle is a synonym. Cab. Le Conte.

17. *For* solitarius *read* solitarium.

21. Cerasphorus quadrispinosus = rusticus *F.* 2, 311. Oliv. 69 tab. 2.16, the locality of Fabr. being incorrect. CHION *Newn.*, takes precedence of CERASPHORUS.

22. Enaphalodes lecontei ⊥ *Dej.* is correctly referred. The genus scarcely differs from Elaphidion. The inverted mark ⊥ is used to indicate an uncharacterised name, and ‡ (See No. 85) to signify *in error*. Both are to be placed *between* the name and the authority, thus *separating* what do not properly belong together. With these, two vertical lines may indicate a name improperly employed for the second time, as HETEROSCELIS ‖ *Dupont*, which is CAMPYLOCNEMIS *Ww.*, there being another genus previously named HETEROSCELIS. See No. 319.

25. *For* Elaphidion aspersum, *read* incertum *Nm.*

26. *For* E. truncatum *read* inerme *Nm.*

27. *For* muriaticus *read* muticus.

33. Elaphidion bidens *F.* *Add* E. spinicorne *Nm.*

39. *Dele* var. brunneum. Most dark coloured species are paler when immature.

43. Hylotrupes baiulus *Lin.* occurs from Mass. to Car.

44. Arhopalus fulminans *F.* Hab. Mass. to Alab. Wiskonsin.

46. Callidium cyanellum † *Dej.* has been described by Newman as *antennatum.* Ent. mag. 5,393.

56. Tetropium *Kb.* (1838) Fauna Bor. am. 174, pl. 5, fig. 8.= Criomorphus *Muls.* (1839) Coleop. de France.=Isarthron † *Dej.*

59. Smodicum cucuiiforme *S.* Callid. cylindroides *Nm.* Ent. mag. 5,394, is a synonym.

61. Stenosphenus notatus *O.* *Add* deflendum *Nm.* (Elaphid.)

73. Clytus luscus *F.* *Add* humeralis *Nm.* Ent. mag. 5,394.

77. *For* Clytus vespoides *read* C. marginicollis *Lap.*

80. Clytus caprea *Say.* *Add* elevatus *Lap.* and gibbicollis *Lap.*

81. C. hamatus *Say* is distinct from C. gazella *F.* and is the same as C. ruricola *O. fide* Laporte.

82. C. undulatus *Say.* *Add* undatus *Kb.*=sayi *Lap.*

85. C. fuscus *Kb.* *Add* undulatus ‡ *Lap.*

87. *For* muricatus *read* muricatulus *Kb.*

Dele No. 89, *vide* 190.

96. *For* gazelluta *read* gazellula.

99. Phyton must replace Diozodes, but Say's trivial name has priority of Newman's *limum.*

102. Nothrus scarcely differs from Gracilia.

103. The generic name Plectromerus † *Dej.* must give way to Curius *Nm.*

105. *For* maculatum, pallidum; *read* maculatus, pallidus.

108. *For* linearis *read* lineare.

109. *For* Gnomo *read* Gnoma.

113. *Dele* Necydalis americanus, which is ♀ of 114 N. mellitus, Mr. Brevoort, of N. Y., having found them *in coitu.* Genus Callisphyrus *Nm.*

115. Genus Heliomanes *Nm.*

115½. Molorchus corni was overlooked in the enumeration.

116. Moneilema *Say*, seems to have a synonym in Collapteryx *Nm.* It represents Dorcadion upon the western continent, and appears to inhabit a similar region with that genus. I am indebted to Dr. Le Conte for a specimen.

118. *For* A. *read* A?

125–6. Dr. Le Conte thinks Amniscus marginellus ♀ Dej. *Hald.* identical with A. aculifera *S.* and in a letter states that "Say was in error when he wrote *tip entire*, as they are truncate in all the genus."

132–3. Dr. Le Conte thinks Amniscus sticticus and A. macula identical.

138. Lamia facetus *Say*, is stated by Dr. Le Conte to be a LEIOPUS.

145. Leiopus symmetricus. *Syn.* L. rufiventris ♀ *Harris.*

151. Having now a specimen of this species, I am able to refer it to EXOCENTRUS instead of POGONOCHERUS, in which it was provisionally placed.

152. Dr. Le Conte thinks this should be considered an EXOCENTRUS, and he has doubts of DESMIPHORA being a good genus.

158. *For* Monohammus maculosus *read* confusor *Kb.* N. Z. p. 168.

160. *For* M. tomentosus *read* marmorator *Kb.*, 169.

161. *Dele* marmorator.

163. The possible reference to Astynomus nodosus ♀ should have been questionable.

164. I have received specimens of Plectrodera scalator from New rleans, through Mr. Guex, and Dr. Morris has an individual taken in Washington, D. C.

179. Compsidea tridentata occurs from Mass. to Alab. and in Missouri.

180. C. lateralis appears in June and July.

188. Saperda pergrata *Say* (now in Cab. Le C.) is a STENOSTOLA.

190. Atimia tristis is Clytus confusus *Say*, as Dr. Harris has recently shown me. It will of course take Say's trivial name.

191. I think it best at present to refer ATAXIA to STENIDEA.

192. Stenostola fuscipes *Say*, placed in this genus by Dejean, is a SAPERDA, and the ♂ of Saperda discoidea *F.* The two have been found *in coitu* by several observers.

195. O. myops. *Add*—a small spot upon the humeri, another between the anterior and medial feet; superior and posterior margin of the mesosternum, and a lateral blotch upon the 2d and 3d abdominal segments, black, Pennsylvania in June, on Acer.

201. Oberea monostigma. The eyes are distinctly divided in 2 by the antennæ, the larger division being inferior. This is considered a generic character, and I accordingly propose the name OBEROPA, from ΩϬη, ωϬαζω, and ωψ, a rather obscure etymology, but which is

chosen from its similarity to OBEREA. It is so seldom that the etymology is expressive, that I seldom give it, considering that generic names should be used as proper names, as in the case of Cicindela, Lamia, &c.

204. Amphyonycha marginata *F.* Hab. Georgia. *Syn.* Saperda flammata *Nm.*

205. Distenia undata *F.* Hab. New York, Penna. and Georgia. It has a disagreeable scent when recent.

208–9. The Genus RHAMNUSIUM was inserted doubtfully on the strength of Dr. Harris's comparison of his insect with the European Rhamnusium. Having recently seen his specimen, I find it identical with Toxotus rubidus; it will accordingly be called Toxotus decoloratus *Harris.* It has been found at Niagara.

213. Toxotus cylindricollis *S.* Probably *dives* of Newman.

215. Toxotus æsculi = cinnamoptera *Randall* (Leptura), Bost. J. 2,45. Mass. Car.

225–6. These are identical, but the true Pachyta leonardii, recently shown to me by Dr. Harris, is my No. 259 Leptura malachiticus.

232. Var. solitaria, hab. Alab. Missouri. *For* confluenta *read* confluens.

238. S. zebrata (?). S. aurigera *Nm.* seems to be a synonym of this species, rather than of S. velutina. The *zebrata* noticed by me seems not to be that of Fabricius, whose description requires *black* antennæ, which would associate it with *zebra.*

241. S. velutina. Pa. July. A variety occurs in which the elytra are of a uniform reddish colour, clothed with yellowish sericeous. North-west Illinois. 242. S. fugax is probably the male.

243. S. luridipennis is identical with mutabilis *Nm.*

255. *For* cinnamoptera *read* erythroptera *Kb.* as the erythroptera of Zenker was published in Germar's Species, in 1825, whilst Say's rubrica (No. 256) was published in 1824, and must consequently take precedence.

259. L. malachiticus, of which my *cyaneus,* (Proced. Acad. Nat. Sc. 3,151,) is a variety. It, with L. vagans, comes better under Pachyta.

272. Leptura semivittata seems to be *vittata* No. 261.

277. L. proteus. *Omit* biforis.

281. Anoplodera 4 vittata, var. *pallida,* is Newman's *directa.*

285. Prionus fissicornis *Hald.* Proceed. A. N. S. 3,125.

286. Sphenostethus serripennis *Hald.* id., 126. Alluded to but

not described by Westwood (Arcana ent. 1,40) as Hoplopteryx denticulatus. He gives no locality.

287. Sclerocerus muticus ⸸ *Dej.* Cat.

288. Molorchus tenuipes *Hald.* id. 3,126. I propose to separate this as a distinct genus to be named TESSAROPA. The facies and antennæ are as in Molorchus, but the head is more vertical, the eyes divided, the inferior division the largest, oval, and prominent; prothorax simple, cylindric; feet short and slender; femora not clavate. The body and antennæ are pilose, the latter longer than the body. T. *tenuipes* is black, punctate scabrous, with the base of the elytra fulvous, and the hairs of the antennæ nearly erect. It is somewhat smaller than the next species, and like it, the wings are not folded.

289. Tessaropa ventralis. Black, punctate-scabrous, abdomen fulvous, femora sometimes fulvous. 3 lines, or 4 to the apex of the wings.

290. Eburia distincta *Hald.* Proceed. Acad. Nat. Sc. 3,150.

291. Elaphidion simplicicollis *Hald.* (Enaphalodes) ib. 151.

292. Strangalia strigosa *Newman.*

293. Leptura badia *Nm.* 294. L. nobilis *Nm.* 295. L. sinuata *Nm.* 296. L. indirecta *Nm.*

297. L. stictica *Nm.* 298. L. vibex *Nm.* 299. L. allecta *Nm.* 300. L. exigua *Nm.*

301. L. hæmatites *Nm.* 302. L. nana *Nm.* 303. (211?) L. vittigera *Rand.* Bost. J. 2,29. 304. L. semimarginata *Rand.* ib. 2,30. 305. L. plebeia *Rand.* 2,28. 306. L. monticola *Rand.* 2,27.

307. Lamia marmorata *Randall.* Bost. J. 2,26.

308. Lamia sexguttata *Say.* J. Acad. Nat. Sc. 3,269.

309. Saperda trigeminata *Rand.* Bost. J. 2,43.

310. Saperda cretata *Nm.* Ent. Mag. 5,395.

311. Obrium rubrum *Nm.* = rufulum?

312. Callidium antennatum *Nm.* 313. C. æreum *Nm.* Ent. Mag. 5,393. 314. Curius scambus *Nm.*

315. Thia pusilla *Nm.* 316. Spacalopsis stolata *Nm.*

317. S. suffusa *Nm.*

318. Elaphidion irroratum *F.* Omitted as a West Indian species, but it has occurred several times in the United States, and as far north as New York, taken by Mr. Calverly.

319. Elaphidion njumanii *Hald.* E. bidens ‖ *Nm.* The Fabritsian *bidens* must have 2 spines to each articulation of the antennæ, whilst that of Newman has but 1.

320. Elaphidion arctum *Nm.* 321. E. pumilum *Nm.* 322. E. deflendum *Nm.*

323. Encyclops cæruleus *Say* (Leptura), J. Acad. Nat. Sc. 5,280. Encyclops *Nm.* pallipes *Nm.* Ent. Mag. 5,392. This genus seems more nearly allied to Molorchus than to Leptura.

Adjourned Meeting, November 9.

Present, thirty-one members.

Dr. Chapman, President, in the Chair.

The special business of the meeting was transacted

Stated Meeting, December 17.

Present, twenty members.

Dr. Bache, Vice-President, in the Chair.

Letters were received and read:—

From the Ethnological Society of Paris, dated 25th August, 1847, announcing a donation to this Society; and a desire that they should receive in return the publications of this Society: and,—

From Mr. W. D. Lewis, dated Philadelphia, 17th December, 1847, on matters connected with his claim against the Society.

The following donations were announced:—

FOR THE LIBRARY.

Journal Asiatique, ou Recueil de Mémoires, d'Extraits et de Notices relatifs à l'Histoire, à la Philosophie, etc. des Peuples Orientaux. Quatrième Série. Juin, 1847. No. 45. Tome IX. Juillet, Août. Nos. 46 et 47. Tome X. 8vo.—*From the Society.*

Mémoires de la Société Ethnologique. Tome premier, en deux parties, 1841. Tome Second, en deux parties, 1845. 8vo.—*From the same.*

Bulletin de la Société Ethnologique de Paris. Tome premier, Année 1846. Année 1847. Janvier à Mars. 8vo.—*From the Ethnological Society of Paris.*

Summary of the Transactions of the College of Physicians of Philadelphia. From June to November, 1847, inclusive. Vol. II. No. 3. 8vo.—*From the College.*

Journal of the Franklin Institute of the State of Pennsylvania. Vol. XLIV. No. 264. Third Series. Vol. XIV. December, 1847. No. 6. 8vo.—*From the Institute.*

Proceedings of the Historical Society of Pennsylvania. Vol. I. February, No. 9. March, No. 10. September, No. 12. 1847. 8vo.—*From the Society.*

Fisher's National Magazine and Industrial Record. Published by Reawood Fisher, New York. Vol. I. June to November, 1845. Vol. II. December, 1845, to May, 1846. Vol. III. June to November, 1846.—*From Thomas Gilpin, Esq.*

Females and their Diseases; a Series of Letters to his Class. By Charles D. Meigs, M.D. Philadelphia, 1848. 8vo.—*From the Author.*

Memoir of Francis Baily, Esq., D.C.L. Oxford and Dublin, President of the Royal Astronomical Society, &c. &c. By Sir John F. W. Herschel, Bart. 8vo. Accompanied with a Portrait, engraved by Thomas Lupton, from the original painting, by Thos. Phillips, R.A., of Mr. Baily.—*From the Rev. R. Sheepshanks.*

A Brief Notice of the Life, Researches, and Discoveries of F. W. Bessel. By Sir J. F. W. Herschel. 8vo.—*From the same.*

ADDITIONS TO THE LIBRARY BY PURCHASE.

Annales de Chimie et de Physique. Par MM. Gay-Lussac, Arago, Chevreul, etc. Troisième Série. Tome XXI. Septembre, Octobre, 1847. 8vo.

Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences. Tome XXV. Nos. 5 à 16. 2 Août, 18 Octobre, 1847. 4to.

On motion of Dr. Patterson, the Committee on the Solar Eclipse, appointed at the meeting of the 6th December, 1844, was discharged.

Judge Kane announced the death of Chancellor James Kent, of New York, a member of this Society, who died on the 12th instant, at the age of 85; when on motion of Mr. G. W. Smith,

Judge Kane was appointed to prepare an obituary notice of Chancellor Kent.

Professor Kendall presented a communication from Mr. Walker, containing new elements for the planet Neptune.

Prof. Kendall communicated the following elliptic elements of the planet Neptune, derived by Mr. S. C. Walker from a discussion of 689 observations, including those made by Lalande in 1795.

Long. of perihelion,	$\pi = 48^\circ\ 2'\ 2''.93$	Mean Equinox of Jan.
" ascending node,	$\Omega = 130\ 4\ 35.03$	1st, 1847.
Inclination,	$i = 1\ 46\ 59.54$	
Eccentricity,	$e = 0.00857741$	
Mean daily sidereal motion,	$\mu = 21''.55448$	
Epoch, January 1st, 1847,	$M = 328^\circ\ 31'\ 56''.36$	Mean noon, Greenwich.
Period,	$T = 164.6181$	Tropical years.

The heliocentric co-ordinates for the mean equinox of January 1, 1847, are,—

$$x = [9.9998769].\ r.\ \sin(v + 138^\circ\ 2'\ 52''.13)$$
$$y = [9.9662265].\ r.\ \sin(v + 48\ 55\ 27.32)$$
$$z = [9.5800962].\ r.\ \sin(v + 45\ 2\ 37.90)$$

The four normal places used as the basis of these computations are given below, corrected for parallax, and refraction, but not for planetary aberration. They are referred to the mean equinox above mentioned. The perturbations of Neptune by all the other planets, were computed by Prof. Peirce, and have been applied to the elliptic places.

Mean time, Greenwich.		1795 May 9d.45256	1846 Nov. 7d.0	1847 April 6d.0	1847 Aug. 22d.0
Obs. Geo. R. A.,	A	213° 39' 34''.18	327° 49' 50''.24	331° 49' 45''.65	331° 19' 13''.71
" Dec.,	D	−11 34 36.21	−13 34 21.65	−12 9 17.82	−12 24 7.55
True elliptic long.,	v	215 48 12.73	327 13 58.37	328 8 0.93	328 57 44.75
Perturbations,	δv	+ 37 60	+ 32.10	+ 31.29	+ 29.49
True ell. Rad. Vec.,	r	30.28772	29.99441	29.99042	29.98677
Perturbations,	δr	+ 0.01207	+ 0.01608	+ 0.01497	+ 0.01493
Computed Geo. R.A.	A'	213° 39' 32''.32	327° 49' 53''.16	331° 49' 44''.82	331° 19' 13''.95
" Dec.	D'	−11 34 34 89	−13 34 20.42	−12 9 20.47	−12 24 7.56
Corr. Eph.,	$A - A'$	+ 1.86	− 2.92	+ 0.83	− 0 24
"	$D - D'$	− 1 32	− 1.23	+ 2.65	+ 0.01

Professor Tucker read a paper on "the Association of Ideas," in which, in conformity with his lectures formerly delivered

in the University of Virginia, he maintained that all the phenomena of mental association were to be explained by that law, both of body and mind, by which each has a tendency to repeat its former acts; and that it is a necessary result of this law that proximity of time or place, resemblance, and contrast, are the principles of connexion between conjoined ideas.

Professor Tucker further remarked, that there appeared to be some coincidence between his views of association and those of Sir William Hamilton in his recent edition of Reid's works, but the latter part of the note on this subject being omitted, by the carelessness of the binder, in the copy he had seen, the only one he believed in the city, he could not yet say how far Professor Hamilton's theory of association agreed with his own, and how far they differed.

The Committee of Finance, by Mr. C. C. Biddle, made their annual report.

ERRATUM.

In the Proceedings, Vol. IV., No. 35, p. 269, the final character of the Wyandot numeral for *five*, should be inverted.

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